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## KOREAN PATENT ABSTRACTS

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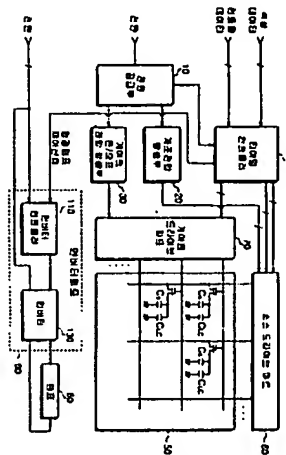
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## (54) DRIVING CIRCUIT OF LCD

## (57) Abstract:

PURPOSE: A driving circuit of LCD prevents the perception of afterimage generated between frames by controlling the on/off operation of a back light in every frame, and powers off the back light to prevent the change of a screen caused by the movement of liquid crystal corresponding to an applied electric field when the response speed of the liquid crystal is delayed.

CONSTITUTION: An inverter circuit(90) for applying AC electric power to a fluorescent lamp(80) comprises an inverter controller(110) outputting the control signal of DC voltage component and an inverter(130) applying the amount of AC electric power corresponding to the DC level of the control signal. A timing controller(40) applies the fluorescent lamp control signal with off time synchronized with a vertical synchronization signal to the inverter controller(110) of the inverter circuit(90). Then, the inverter controller(110) powers the inverter electric power for driving the fluorescent lamp(80) off during the off time by the fluorescent lamp control signal. Therefore, the electric power applied to the fluorescent lamp(80) is intercepted instantaneously the very moment that the frame of a liquid crystal panel(50) is changed.



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## Patent Application

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English Title of Invention	Drive circuit for an LCD
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We file an application under Article 42 of Patent Act as above. Agent Pyeong-Seop Im (Signature)	
Official Fee	
Application Fee	14 page(s) 29,000 won.
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## Patent Specification

## Abstract

## Abstract

The present invention relates to the driver circuit of the liquid crystal display, more particularly, to the driver circuit of the liquid crystal display which authorizes the fluorescent lamp control signal synchronizing in the vertical synchronizing signal in which the timing controller is applied in the timing controller in the inverter circuit for supplying the AC power supply to the fluorescent lamp among the driver circuit of the fluorescent lamp used as the back light lamp of the liquid crystal panel, and it cuts off the power source of the fluorescent lamp in synchronization with the vertical synchronizing signal indicating the exchange of the next frame in one frame, and in that way it instantaneously switches off the fluorescent lamp whenever the frame of the liquid crystal panel is changed, and a man does not recognize clearly to be attracted of the image according to the reaction speed delay of the liquid crystal, and when the moving picture is implemented in the liquid crystal display, improves the picture quality.

The driver circuit of the liquid crystal display has the effect that it has the effect preventing the recognition of after image generated around a frame and the frame coming of the back light the off is controlled according to the frame unit. And the back light is switched off when the response speed delay of the liquid crystal is generated. In that way the change of a screen by the movement of the liquid crystal while moving is blocked in response to the electric field in which the liquid crystal is applied.

## Representative Drawing

Drawing 1

## Index Term

The inverter control portion, and the inverter circuit.

## Specification

## Title of Invention

Drive circuit for an LCD{Drive circuit for an LCD}

## Brief Description of the Drawings

Figure 1 is a block diagram of the preferred embodiment.

Figure 2 is a timing diagram of one frame of the preferred embodiment.

## The Detailed Description of Invention



## The Purpose of Invention

### Field of Invention and the Prior Art

The present invention relates to the driver circuit of the liquid crystal display, more particularly, to the driver circuit of the liquid crystal display in which a man does not recognize clearly to be attracted of an image between the frame according to the reaction speed delay of the liquid crystal the fluorescent lamp is instantaneously switched off the power source of the fluorescent lamp is cut off the frame of the liquid crystal panel is changed.

As a recent, and the current society are informatized, the various information is digitized and it is processed. And it is in the trend that the significance and specific gravity of the liquid crystal display for indicating the information as to the information displayer with a digital gradually increase.

Various researches for going with this trend of the times and obtaining the information indication characteristic of being better from the liquid crystal display are accomplished in each field. And the characteristic of being day by day new and the various products using a mode are brought.

The integrated of the driver circuit, the minimization of the pixel pitch for the secure of the aperture ratio, the photo current reduction, for preventing the temperature rise of the panel the reliability insurance of the part etc. are in the field which is studied in order to obtain the better information specific like the upper part. And recently the research much more, for near implementing the moving picture in a reality is actively comprised.

Particularly, it has to become 30~60HZ which is the frequency in which a man cannot recognize clearly the change of a screen in order to implement the moving picture. However, the liquid crystal of the liquid crystal display has the physical limit called the bit worst response speed. Therefore, this is overcome. The lively research for improving is accomplished.

It is the same as that of the next time if it illustrates for the response speed of the liquid crystal of the NT mode.

If a voltage is applied in the liquid crystal pixel having an anisotropy, the arrangement of the liquid crystal changes. The liquid crystal perpendicularly arranged with the applied voltage conducts the light provided from the lower part. Since the a voltage does not add liquid crystal does the action of returning to the horizontal state with the interaction of the liquid crystal molecule and the orientated layer which it tenuously plates on the conductive film and it blocks the light the liquid crystal which comprises the screen of the liquid crystal.

The liquid crystal perpendicularly arranged according to the electric field applied in this way and it has the speed of horizontally arranging with the characteristic of being physical of the liquid crystal with the some delay speed. This speed is as the response speed of the liquid crystal. And the screen of the liquid crystal display leaves after image which seems to be attracted with this response speed.

Particularly, so that the liquid crystal display implement the moving picture, many frame passes to each second unit to a cycle more than the several tens HZ. The liquid crystal has to receive the change of many electric field as much as the number of the frame passing is many. Therefore, after image shape according to the response speed delay of the liquid crystal is more serious. And a man is such ghost acknowledged as the scull of a screen.

### Technical Problems to be solved by the Invention

The object of the present invention prevents a ghost between a frame and the frame generated around the delay of the response speed of the liquid crystal the moving picture is implemented in the liquid crystal display, it has.

Another object of the present invention is that in a configuration of the present invention and the action mentioned later, more concretely, it will be explained.

### The Structure and Function of the Invention(Device)

The driver circuit of the liquid crystal display is applied about the predetermined constant voltage and it converts into the fluorescent lamp authorized through the sheet consisting of the gate on/off voltage generating unit and the power supply unit supplying a voltage to the gradation voltage generation part, gate on/OFF voltage generation unit generated around the on/off voltage, the liquid crystal panel, the timing controller which is generated the vertical synchronizing signal, which is input from an outside the gate control signal, the source drive part, the gate driver part, the polarization sheet the light it is generated the light in the lower part of the liquid crystal panel, and the diffuse sheet and protection sheet in the liquid crystal panel and the AC power supply for being provided with the DC power supply and operating the fluorescent lamp. And in order to supply the transformed AC power supply to the fluorescent lamp, the driver circuit of the liquid crystal display is comprised of the inverter circuit arranged between the DC power supply and fluorescent lamp. It authorizes the predetermined signal synchronizing with the vertical synchronizing signal and the inverter circuit and it blocks the power supplied to the fluorescent lamp between a frame and frame. In that way the after drawing lock box in the liquid crystal panel of the frame providing the power source for the fluorescent lamp if the liquid crystal panel is changed to the next frame at the same time, the light of the fluorescent lamp was turned off at the moment when the frame of the liquid crystal panel was changed and having the predetermined time interval and is generated the light and is changed to a feature. Gate on/OFF voltage generation unit generated around the on/off voltage sticks up the gate by taking advantage of the generated gradation voltage generation part, and the voltage applied in the power supply unit a plurality of gradation voltages the voltage applied in the power supply unit is taken advantage of. The liquid crystal panel the liquid crystal is injected in the color filter substrate and TFT (it says to be the Thin film transistor: thin film transistor, or less 'TFT') substrate interval and the liquid crystal is formed, and each liquid crystal pixels are generated in the back light assembly of the lower part and passes the light coming up through the sheet through, or it blocks and forms the prescribed screen. As to the, control data and color data of the horizontal synchronization signal are input and controlling the gate terminals of TFTs formed in the liquid crystal panel according to the horizontal line and the source data signal authorizing color data in each source terminal, and which is connected to the gate drive IC and in which the gate control signal is provided, and which is connected to the source drive integrated circuit and which the source data signal is provided. As to the source drive part, a plurality of source drive integrated circuits which is applied about color data in timing controller and in which gradation voltages are applied from the gradation voltage generation part and outputting source signals is arranged. As to the gate driver part, a plurality of gate drive ICs which is applied about the gate on/off voltage in the gate on / off voltage generation unit and is applied about the control sign in timing controller and outputs gate signals is arranged.

Below, and a configuration and actions of the preferred embodiment are evident than the detailed description and attached view.

The preferred embodiment by figs. 1 and 2 are comprised of the power supply unit (10), gradation voltage generation part (20), gate on/off voltage generating unit (30), timing controller (40), liquid crystal panel (50), source drive part (60), gate driver part (70), fluorescent lamp (80), inverter circuit (90).

Concretely, in the main power source, in order to be provided with the power source and it supplies the gradation voltage generation part (20) and the DC power supply which the power supply unit (10) is done by the respective need in the gate on/off voltage generating unit (30) the DC power supply are connected.

In the power supply unit (10), the gradation voltage generation part (20) is provided with the DC power supply and it produces gradation voltages. The DC power supply is connected to a plurality of source drive integrated circuits (non illustration) positioned in the source drive part (60).

In the power supply unit (10), the gate on/off voltage generating unit (30) is provided with the DC power supply and it is generated the gate on/off voltage. And the DC power supply is connected to an plurality of gate drive ICs (non illustration) arranged in the gate driver part (70).

As to the timing controller (40), control data and color data including the vertical synchronizing signal (frame division signal) and horizontal synchronization signal (line division signal) are inputted and it is generated each gate drive IC (non illustration), the control signs and data required in the source drive integrated circuit (non illustration). And in order to provide to each gate drive IC (non illustration) and source drive integrated circuit (non illustration) the timing controller (40) is the control signs and such data connected with the synchronized order.

The liquid crystal is injected between the color filter substrate (non illustration) and TFT substrate (non illustration) and the liquid crystal is formed. And a plurality of TFTs formed in the TFT substrate (non illustration) into the matrix shape is formed. And the gate or the source electrode of each thin film transistor elements share with one row. The liquid crystal panel (50) opens. In the whole matrix, it is connected to the gate terminal of whole TFT of one row lines to one gate drive IC (the non illustration) in order to be at the same time turned on/off the gate turns.

In the source drive part (60), a plurality of source drive integrated circuits (non illustration) is arranged. And the source drive integrated circuit (non illustration) and liquid crystal panel (50) of the source drive part (60) are connected by the tape carrier package (non illustration) and electric signals generated in the source drive integrated circuit (non illustration) are applied as each TFTs of the liquid crystal panel (50).

In the gate driver part (70), a plurality of gate drive ICs (non illustration) is arranged. And the gate drive IC (non illustration) and liquid crystal panel (50) of the gate driver part (70) are connected by the tape carrier package (non illustration) and electric signals generated in the gate drive IC (non illustration) are applied as each TFTs of the liquid crystal panel (50).

As to the fluorescent lamp (80), in the lower part or the side of the liquid crystal panel (50), in order to be generated the light and it authorizes through the sheets (non illustration) consisting of the polarization sheet the light, and the diffuse sheet and protection sheet in the liquid crystal panel (50) the light is comprised.



As to the inverter circuit (90), in order to be provided with the inverter power and it supplies the AC power supply to the fluorescent lamp (80) it is connected. And it is comprised of the inverter controller (110) and inverter (130).

Concretely, in the inverter controller (110), the fluorescent lamp control signal (c) synchronized with the vertical synchronizing signal (a) of the timing controller (40) and inverter power is applied and the control signal of the DC voltage component is outputted.

As to the inverter (130), in order to supply the AC power supply corresponding to the direct current level of the control signal of an amount it is comprised.

If the process where the liquid crystal display by the configuration as described above indicates a screen is explained, the process is as follows:

As to the timing controller (40), by using control data and color data, it produces the source drive integrated circuit, the control signals and data required in the gate drive IC. And it is synchronized and at this time, the timing between these signals are controlled.

If a plurality of source drive integrated circuits (non illustration) formed in the source drive part (60) latches the source signal which it outputs if data are input and the color signal voltage is applied, each color signal voltage is latched. The gate drive IC (non illustration) successively authorizes the pulse, for successively conducting the gate electrode of each row line that is, the gate signal in the liquid crystal panel (50).

The liquid crystal panel (50) runs with the source signal and the above-described gate signal. Concretely, if the vertical synchronizing signal (a) is applied and the beginning of one frame is shown, it becomes the gates of TFTs of the first line with the gate signal which is synchronized to the horizontal synchronization signal (b) and is outputted with on. Each source drive integrated circuit latching the source signal provided to each TFT all at once authorizes a signal in the source terminal of TFTs of the first line. And each source drive integrated circuit (non illustration) all at once authorizes each source signal in the source terminal of TFTs of the next line if it becomes all at once the gates of TFTs of the next line with the next gate signal with on. And one frame is completed if the source signal is authorized to this order to the final row line.

As described above, as long as a man can recognize clearly if the light is provided to the liquid crystal panel (50) running, the screen of the frame measure is formed.

In the liquid crystal panel (50), after being one frame classified with the vertical synchronizing signal (a) after being indicated, the screen of a frame is formed with the process as described above.

At this time, the timing controller (40) is generated the fluorescent lamp control signal having the off period synchronized to the vertical synchronizing signal (a) like (c) of fig. 2 and it authorizes in the inverter controller (110) of the inverter circuit (90). The inverter controller (110) applied about the fluorescent lamp control signal (c) blocks the inverter power which is applied in order to operate the fluorescent lamp (80) with the fluorescent lamp control signal (c) as the off period. In that way at the moment when the frame of the liquid crystal panel (50) is changed, the power source provided to the fluorescent lamp (80) is instantaneously blocked. And then, the fluorescent lamp (80) is turned on after being put out as the off period of the fluorescent lamp control signal (c).

Figure 2 is a timing diagram of one frame of the liquid crystal display of the preferred embodiment. The horizontal axis of each signals mean the time and the vertical axis is the size of the signal voltage.

Concretely, the vertical synchronizing signal (a) is inputted to one frame period and a frame and the signal line, the horizontal synchronization signal (b) distinguishing a frame are the line and the signal distinguishing the line. The horizontal synchronization signal (b) corresponding to the whole row line for one vertical synchronizing signal (a) of a number is applied.

The fluorescent lamp control signal (c) is synchronized to the vertical synchronizing signal (a). And the off block of the fluorescent lamp control signal (c) coincides with the sync period of the vertical synchronizing signal (a), or it is small, or it can be set up in order to be more enlarged. This can be controlled according to the intention of the manufacturer considering the response speed of the liquid crystal.

In conclusion, in order to prevent after image generated around the delay of the response speed of the liquid crystal the moving picture is implemented in the liquid crystal display, it blocks the power source of the fluorescent lamp (80) in the period when a frame and the vertical synchronizing signal (a) distinguishing a frame of the liquid crystal panel (50) are applied and it does not irradiate the light in the liquid crystal in which after image lingers. In that way the liquid crystal has the configuration where for hour man which the present invention arranges will not allow to recognize after image with the response speed.

The arrangement methods of the switching element and the switching element various in order to achieve this configuration can be suggested. And it grows up, the deformation application of the switching circuit or the other switching means and of which arrangement method easily can perform.

As illustrated in detail in the above, the present invention was circumstantially described about the preferred embodiment. However, it is the man having the normal knowledge as to the technical field in which the present invention belongs. If it is the case, the man will be able to know to while not being out of the spirit of this invention and range, variously change the present invention or change and can perform.

#### Effect of Invention(Device)

It is according to describe in detail. And the present invention has the effect that mode switched off the drive of the fluorescent lamp generated around the light applied in the liquid crystal panel of the liquid crystal display are used between a frame and frame. In that way a man does not recognize after image between a frame by the response speed delay of the liquid crystal and a frame when the liquid crystal display implements the moving picture and the picture quality is improved in the dynamic image embodiment.

#### Scope of Claim(s)

##### Claim [1]

The driver circuit of the liquid crystal display, wherein: control data and color data including the voltage supply means producing the gate on/off voltage and gradation voltages as the predetermined constant voltage, and the vertical synchronizing signal and horizontal synchronization signal it is provided with the power source in the power supply unit are input and it is generated the control sign, the source signal and fluorescent lamp control signal: it is comprised of the timing controller controlled, the source drive part and the gate driver part, the liquid crystal panel indicating a screen with the source drive part and the signal applied in the gate driver part, the fluorescent lamp, and the inverter circuit so that the timing between signals be synchronized: and since it is synchronized with the inputted vertical synchronizing signal and the timing controller and the frame of the liquid crystal panel blocks the power source of for hour fluorescent lamp transferring to the next frame the fluorescent lamp control signal switches off the fluorescent lamp: the source drive part and the gate driver part is applied about the control sign and source signal in the timing controller and runs: the fluorescent lamp is generated the light in the lower part of the liquid crystal panel: and delivers the generated light to the liquid crystal panel through the sheet: and the inverter circuit converts into the AC power supply for being applied about the predetermined DC power supply and operating the fluorescent lamp: and is applied about the fluorescent lamp control signal in the timing controller.

##### Claim [2]

The backlight driving circuit of the liquid crystal display for doing a holding about the long time slot more than the vertical synchronizing signal in the point of time to a feature of claim 1, wherein the fluorescent lamp control signal synchronizes in the vertical synchronizing signal.

#### Drawing

Figure 2



